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ABSTRACT

This interdisciplinary unit is intended for use in kindergarten classes. The unit follows the story line of the book, "Grandma's Beach Surprise," or any suitable children's story about the seashore environment. The unit deals with shelled animals found along the ocean shore. It includes the anatomy of various mollusks, their interaction with the marine and estuarine environment, and their value as a food source to man. Poems, art projects, class discussions, sorting shells, preparation of edible shellfish, and singing are among the activities included with this unit. (RE)

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ED164349

Northern New England Marine Education Project

College of Education

University of Maine at Orono

Orono, Maine

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CLAMS AND OTHER CRITTERS

A Marine Education Infusion Unit

A Maine - New Hampshire Sea Grant Project

Supported in Part by NOAA, Office of Sea Grant

U. S. Department of Commerce and by

The College of Education, University of Maine

SE 026 338

Northern New England Marine Education Project

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College of Education, University of Maine
Orono, Maine

Acknowledgements

This unit was prepared and trial tested in schools in Maine and New Hampshire during spring 1978. Each of the units in this Marine Education Program were trial tested in a minimum of five classrooms and were revised as a result of suggestions by the cooperating teachers. Parts of these units and much of our working philosophy was derived from project C.O.A.S.T. developed at the University of Delaware and we gratefully acknowledge the leadership of Dr. Robert Stegner, director of project C.O.A.S.T. These materials were trial tested under the supervision of former assistant director Dr. Les Picker and were written by graduate students in education at the University of Maine (Orono) and cooperating teachers in the schools of Union, Maine; Freeport, Maine; and Hampton, New Hampshire. We call these units - trial units - because we hope you will try them in your classroom and modify them to suit your situation.

John W. Butzow
Project Director
January 1979

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NORTHERN NEW ENGLAND MARINE EDUCATION PROJECT

ANNOTATED LIST OF INFUSION UNITS: K-8

Trial Edition A

K Clams and Other Critters: a unit on shells (living and non-living). Includes crafts, science, language arts, home economics, math and other areas (Butzow and Jones)

K & 1 Marine Art: art and craft activities to be used in many subject areas (Picker)

2 The Aquarium: revolves around a freshwater aquarium setup. Language arts, math, science, art and others (Kilfoyle)

3 The Beaver: a study of the history, economics and natural history of the beaver. Social studies, language arts, music, arts, crafts, science, math (DiSilvestro)

4 The Lobster: explores the economics, history, biology, literature of the lobster. Home economics, art, crafts, science, social studies, literature. (Kilfoyle)

5 Whales and Whaling: a complete study of the history, biology and economics of whales and whaling. Language arts, music, math, science, social studies, arts, crafts, industrial arts. (Picker, Carkin)

6 Our Heritage of Ships: surveys the development of ships, with emphasis on New England. Science, art, music, crafts, literature, language arts, social studies. (Glueck, Butzow)

7 Ships, Shipping and waterways: explores ships and seaways today, with emphasis on New England. Social studies with excursions into science, arts. (Glueck, Butzow)

8 Coastal Indians of Northern New England: three part approach to Indian studies, culminating in an "Indian Day or Evening." Independent study suggested for Part II. Language arts, library science, music, art, crafts, social studies. marine science, industrial arts. (Picker, DiSilvestro)

Units are available from:
Northern New England Marine Education Project
Shibles Hall, College of Education
University of Maine at Orono
Orono, Maine 04469

SOME TEACHERS AND YOUTH LEADERS COMMENT ON

CLAMS AND OTHER CRITTERS:

"Our shell box with the collection was kept in one corner of the room and the children were free to play with them during their "free time." There were almost always one or two children at the shell box anywhere from five to ten minutes at a time. There was never a day there were not any children spending some time there. This is now a permanent fixture in our room."

"It was surprising the children that live here (seacoast community) that haven't seen some of these critters that live here at the beach. The children got very excited with the large star fish and . . ."

" . . . It did create an awareness of what is found at the beach."

"The children liked handling the shells and it helped them to see the (math) concepts better."

"The children love to act out the way that the clams and crabs move."

"We steamed clams and mussels with both groups and one group made clam and mussel chowder. They loved both activities and absolutely devoured the steamed clams and mussels. This process generated much discussion over the parts they were seeing and eating."

"These activities were constantly being done. Our science table was available to all to come and touch, feel, listen, talk, and question and this they did - constantly! On this table were included reference books and shells contributed by myself, but mostly by the children."

"Included in this book were all the poems written by individual children. This idea came completely from them. One child wrote a poem at home with his mother about scallops and this inspired many others to do the same. This was perhaps the most exciting part of the unit for me because it was their own idea and they were so proud to have their poems shared and copied."

"We made puppets, using my modified directions. It was a huge success. Everyone could do some of the folding unaided. Very few children needed extended help. At least half of the children made more than one, receiving no further help from adults."

"Lobster! Mussels! Periwinkles! What a feast! We also used the opaque projector to view and discuss photographs of live mollusks."

INTRODUCTION

This unit of marine education instruction was originally designed by Dr. John Butzow, College of Education, University of Maine at Orono.

Following an extensive field testing program, Ms. Mildred Jones of Morse Street School, Freeport, Maine, made an annotated series of modified and alternative activities; essentially a new unit of instruction. It was decided to combine both units into the present Clams And Other Critters, incorporating the best suggestions made by other trial unit teachers also.

Les Picker
Assistant Director
Northern New England Marine
Education Project

Instructional Objectives:

The child will demonstrate verbally and with art materials and physical movement that:

1. Some shore animals have shells.
2. Shells are necessary to the animals which live in them.
   a. Shells protect them from hostile environmental conditions.
   b. Shells give some animals their shape.
   c. Shells protect them from their enemies (predators).
3. Shelled animals range in size from too small to see with the naked eye to larger than a child's hand.
4. Some shelled animals have one shell, some have two shells and some shelled animals have a shell which encases them, really an exoskelton.

5. Some shelled animals borrow shells (eg. Hermit Crab).
6. Shelled animals can be classified in a variety of ways.
7. The soft (fleshy) parts of shelled animals enable them to creep, dig or "swim" in characteristic ways.
8. Some shelled animals are adapted to hang onto one place during their adult life.
9. Shelled animals have specialized body parts for feeding, e.g., syphons, beaks, claws.
10. The soft parts of some shelled animals are eaten by humans.

Teacher Background

The Maine-New Hampshire coastline, as well as its fresh water ponds and lakes, are populated with a rich variety of shelled organisms. While this unit will emphasize those found in the salt water or marine environment, numerous examples of shelled animals can be found in fresh water environments which show similar shapes and adaptations to their salt water cousins.

As background for the teacher we recommend the book, Questions and Answers about Sea Life by Ilka List. This book provides a great deal of information about marine plants and animals. It can also be selectively read to small groups of youngsters or used as a source book by older elementary students and adults.

The scene for the unit is set by taking a field trip to a shore area and/or reading the book, Grandma's Beach Surprise by Ilka List. The story line of the book takes Jessie and her dad on a beach walk. They are searching for a present for Grandma, since they didn't remember to bring the book about shells they had purchased for her birthday. The

beach walk can actually be taken by students either before or after reading the book. That experience is reinforced with a shell collection and other activities.

Following is a list of organisms and discussion questions about them. Utilize drawings, pictures, slides or the actual organisms for demonstration.

Organism	Questions to Ask
Beach Plants	Where do plants grow on the shore? Are these plants different from those near your house?
Clam	How does a clam get away from you? How does a clam get food and water into its body? How does a clam taste to you?
Crab	How is a crab's shell different from a clam's shell? Does a crab keep the very same shell all its life?
Sea Gull	How does a sea gull get the meat out of a shelled animal?
Blue Mussels	How does the mussel hold on to rocks or plants? Have you ever tasted a mussel?
Aquaculture	Have you ever head of a mussel farmer?
Sea Snail	What does the sea snail eat? What or who eats snails? How does the snail creep along? How does it drill holes?
Oyster	Where do oysters live? Why is the inside of the oyster shell so smooth?
Scallop	Does a scallop see? How does it "swim"?
Sea Star	How does a sea star move? Where is its mouth?
High Tide Line	Where does all this "sea stuff" come from? What is most of the material?

In discussion procedures in which the above organisms are used either to review the actual field trip or to build upon a seashore book,

it is important to have beach materials available to look at and feel. For example, in discussing how the mussel holds onto rocks or plants, the youngsters should have the opportunity to feel the attachment strings. The same point should be made about the comparison of the clam and crab shell. The organism list should not be covered in one long session. but rather in a series of four or five short sessions in which pictures and objects are used to ask the questions listed and further experience is gained by inspection of the actual materials.

Reading the book, Grandma's Beach Surprise and the resulting beach walk and discussion is intended to arouse interest in shells and shelled animals particularly in terms of how the organism lives, where it lives and what it eats. However. several other fine books can be used for this purpose. Additional activities in the unit are included to reinforce this learning, particularly in a language arts context.

You may wish to send home a letter/questionnaire to parents, seeking their ideas, resources and assistance.

On the following page is a suggested format:

9/10

Dear Parents,

We are about to participate in a marine education project which should be very exciting. Our unit is about shelled creatures that live along the coast of Northern New England or in fresh water ponds. We need all the help we can get to make it really meaningful for the children. Can you help in any way? Please read all the questions!

1) Do you live by the water where you could collect either dead or live shells?
2) Could a few children visit your property (in the next three weeks) to observe (and collect, if possible) shells washed ashore, or live shells on rocks?
3) Do you have a sea shell collection you would share - for touching or just looking?
4) Do you have access to mussels and periwinkles that we could gather to cook?
5) Are you involved in harvesting any shelled animals?
6) If you are currently lobstering, crabbing, or clamming, would you give us a good price on three or four for each of us to taste.
7) If you are currently hauling traps, would you please save any live, nonlobster specimens that might get into your traps, including starfish?
8) Do you have any tools of the trades we could examine - clam basket, clam rake, shucking knife (could you demonstrate?), or lobster gear? How could you share this with us?
9) Do you have any aquaculture projects in progress? Do you have any information about aquaculture?
10) Could you help us set up a simple salt water aquarium?
11) Do you have bits of drift-wood you could gather for us to use in art projects?
12) Would you provide a coffee can, or two, of beach sand? - a jar of salt water?
13) Do you have any ideas for art projects that would tie in with our project?
14) Do you have any pictures, slides, stories, field guides, or things made from shells that you could loan us?
15) Do you know any songs, or have any records that deal with the sounds of, and life within the sea?
16) Would you like to come in to help us on our project?
17) Could you help us by drilling holes in some shells to be hung on mobiles or strung into necklaces, etc?
18) Have you any ideas I haven't thought of? How would YOU help five and six year olds learn about shelled creatures?

If you - or anyone you know - can contribute even in a very small way, please do not throw this letter away unanswered. Just check and return, and I will call you. We begin next week.

Thanks so much from all of us - children, aides and teachers.

Name _____

Phone _____

ART

1. Mural

Make a mural of the ocean with fish and rocks and sea weed. Have the children color, draw and cut out the fish. Add clams and other critters to the mural. Some real shells (small ones) can be glued on this, as can sand.

2. Bulletin Board

After reading the Biggest Fish in the Sea by Dahlov Ipcan, put a large piece of blue paper up on the bulletin board. Give each child a piece of white construction paper and ask them to draw a fish they might see in the sea. It might be a very colorful fish like the ones in the story or one of their own invention. After they have drawn and colored the fish have them cut it out. As each one is finished tape it up on the piece of blue construction paper. You might then have some of your better "artists" draw in seaweed or rocks.

3. Models

Construct shelled animal "models" using water color paints and tissue paper wads. While no one expects the youngsters to accurately depict the structure of each organism, some attention should be given to the soft parts of the animal. In this activity as well as in several later ones, refer to "Seashells in Action," by Audrey Newell.

4. Clay

As an alternate suggestion - make creatures from clay. Sometimes use just clay, sometimes use clay with real shells. If self-hardening clay is available, the creatures can be painted and preserved.

5. Sandcastings

Cut-down milk cartons, dixie cups, individual pot pie foil dishes, etc. can be used for sandcasting containers. A larger one might be constructed as a class project either directly in the sand, or in a larger container.

Fill container to a 1 inch depth with dampened sand. Place an assortment of beachcomber treasurer on the sand. Press in firmly. Pour on about 1 inch of plaster of paris. Gently tap the side of the container to remove all air bubbles. After the plaster has set, tear away the milk carton and remove the plaster from the sand. Some sand will adhere to the plaster. When it has finished hardening, a gentle tooth brushing will remove any loose sand. Shells make excellent castings.

6. Crayon Resist

The children should draw a picture of some sea life and/or activity. Wax crayons are used, and must be firmly pressed to insure a good coating of wax color. Then, a wash of blue (diluted water color paint) is painted over the entire paper. This creates an under water picture, with the sea life still clearly visible.

Note: Sometimes children of this age are very reluctant to paint

over their work, in the thought that it will be erased. Encourage them to be brave!

7. Prints and Rubbings of Shells

Most kindergarteners are really turned on by the novelty of printing and rubbing, whether or not there is any attempt to introduce ideas about symmetry. To make a print of a shell, choose a relatively flat one such as a sand dollar. Paint finger paint onto the shell's surface and then place a flexible rough surface paper such as unused newsprint on top of the coated shell. Blot gently with fingers and hang up the print to dry. Inexpensive "finger paint" can be made from thick flour and water paste colored with food coloring.

Shell rubbings can be made by using a hard paper placed on top of a shell. Gently make lines with a crayon across the paper. The result is an impression of the shell. This works especially well with sand dollars.

Field Trip

A beachcombing visit should be planned with this unit.

Before taking the beachcombing trip, spend some time talking about shells and sea life.

1. As one possibility, before going to the beach each child should be given a brown paper bag and should decorate it (using crayons) with

things they might find at the beach. After the beachcombing trip children might sit in a circle with their bag showing and telling one another what they found and where they found it; that is, high up on the beach, near the water, in the water, on rocks. Each child could then make a picture using top of a small box and gluing their collection onto it.

No special skills are needed other than reference books about the seashore.

2. As a follow-up activity, you should try to maintain an aquarium. Directions follow!

Aquarium Keeping

If you live near the seashore you might keep some sea snails, clams or mussels in a small aquarium or a large jar discarded from the school lunch program. Place sand and rocks in the bottom and a few clams and other animals. Sea water should be mixed with air every day or so by removing about half the water and shaking the removed water vigorously in a closed bottle. Open the bottle after every 3 or 4 shakes to let in more air. Then replace water into aquarium.

Fresh water snails or clams can be kept in the same way but be sure to use water from a natural source such as the pond or stream you collected the animals from. If you use tap water for these fresh water animals they will rapidly die from the chlorine in the water as well as certain metal contaminats. This can be overcome however by using a commercial chlorine removing chemical. Chlor-out and other products are available from pet stores.

To keep an aquarium of natural sea or pond life longer than 3 or 4 days will require providing food sources and aeration or bubbling of air into the aquarium. You are encouraged to keep snails and perhaps mussels for a more permanent aquarium.

Fresh water snails are probably the simplest organisms to keep over a long period of time. Should you desire to do this, snails can be obtained from pet and aquarium stores or from:

Connecticut Valley Biological Supply Co., Inc.
Southhampton, Massachusetts 01073

These snails eat green algae (green slime) which will grow readily in any aquarium which is stocked with pond water. Since the algae bloom takes several weeks in advance, feed the snails bits of lettuce or other green plant material until the algae takes over. Some people have also had success with fresh water clams and mussels as well. If weather precludes gathering these from local ponds they can also be purchased regionally from:

Mr. Claude Bonang
6 Braemar
Brunswick, Maine 04011

In addition to keeping organisms in the classroom, you may want to visit a public aquarium if one is available. In your community there is also probably a grocery store, restaurant or supermarket which sells live clams and lobsters. A visit to a store or restaurant would provide much insight into how marine organisms are cared for and sold. You might also want to have a local lobster man or clammer visit class with the implements of the trade.

SENSORY EXPERIENCES

1. A Music Sensory Experience

Provide each youngster with a shell about the size of his or her hand. Turn out the classroom lights. Place the shell over an ear and listen. Close your eyes, what do you see and hear while on the shore? Who lives there? How do they move? What do they eat? If you were one of them, how would you feel? You might try the same activity with one of the background records suggested in the bibliography.

2. Touch and Feel

For a touch and feel experience, cover a shoe box with pictures of the beach, shells, seaweed, etc. In the top of the box, make an opening large enough for the child to put his hand in. She or he should pick up in her or his hand, but not pull out, a particular shell. After feeling the shell all over, he or she should try to tell the class what he or she has picked up. Then he or she should pull the shell out of the box so all see if he or she was right. Put in one each of a snail, starfish, clam, mussel, sea urchin, sand dollar, oyster, scallop, moon shell, sea moss. Any variety of shells or seaweed can be used. This can be done in a large group or in a learning center.

3. Sand

Collect samples of sand from as many sources as possible. These should be placed in containers where the children can compare texture, color, etc. Include mud from mud flats.

4. Dance

The Clam, Crab or Mussel Dance

Make costumes of supermarket sacks, poster board or corrigated paper from shipping boxes. Art materials may be used to emphasize claws, siphons, attachment threads, hinge lines, etc.

Have youngsters in a dance to music reenact the movements the animals actually make in life. Prior to this activity, you may want to read the class the book, "Seashells in Action," by Audrey Newell.

5. Game: Who Am I?

Have each student dramatize a sea animal, while the others try to guess what it is.

LANGUAGE ARTS

DRAMATICS

1. Fold-A-Puppets

Shortly after the youngsters listen to the book or take the field trip, have them make fold-a-puppets, each with a picture of a "special" organism on it. They can then make two person teams to act out a little play referring to each team member's animal. Try to get the youngsters to consider answering the following questions: (Referring to their animal as "I")

a. How do I live?

b. What parts do I have?

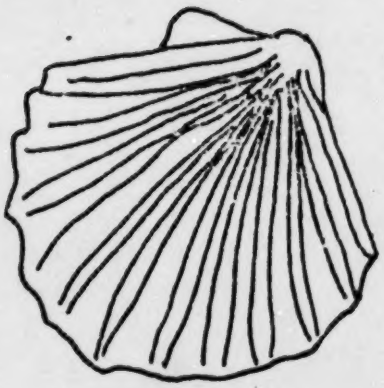
c. How do I move around?

d. How do I eat and drink?

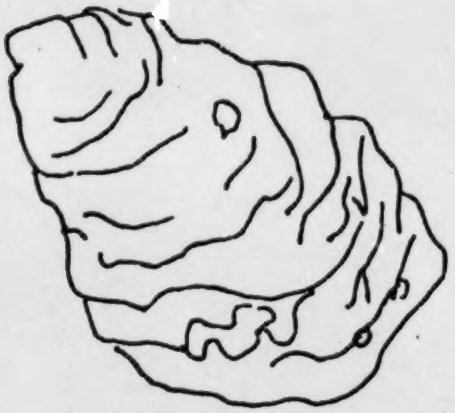
For directions on the construction of fold-a-puppets refer to Figures 1 and 2. (Note on puppet paper folding: Many kindergarteners will not be able to fold the paper well enough for it to function as a puppet body, even with the directions provided. Many will require teacher help to do the folding.

Use the diagrams in Figure 1 to make a ditto master for each major organism included in the slide list. When the body of the puppet is completed, the youngsters can paste a face showing the animal on top of their puppet and color the puppet if they desire.

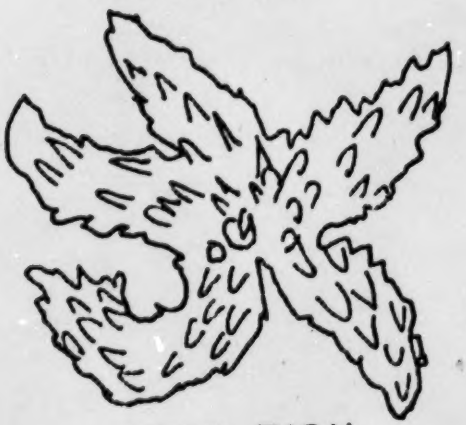
Figure 2 Fold-A-Puppet Directions



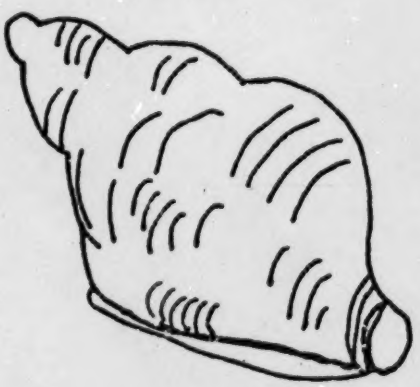
SCALLOP



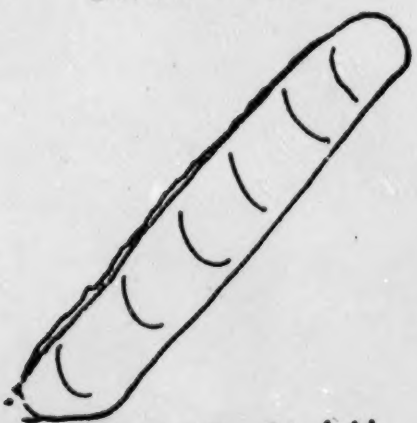
OYSTER



STAR FISH



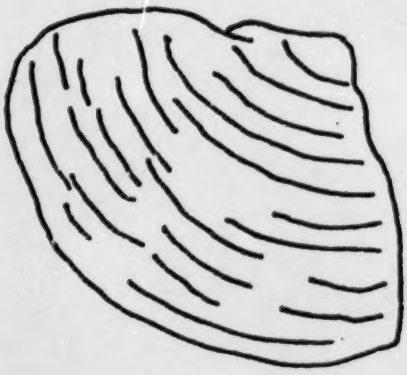
DOG WHELK



RAZOR CLAM

PERIWINKLE

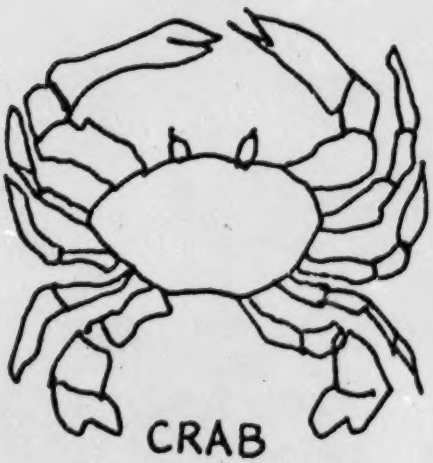
MOON SNAIL



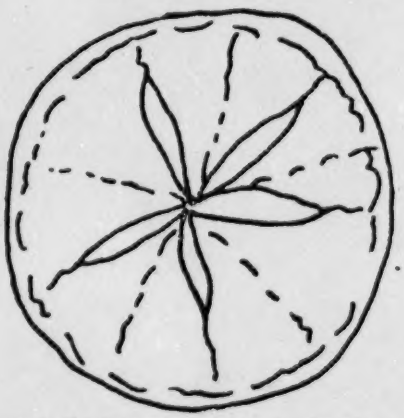
CLAM

MUSSELL

LOBSTER



CRAB



SAND DOLLAR

2. The Walrus And The Carpenter

Use the abbreviated version of The Walrus And The Carpenter as a reading to the group. Have children do group responses for the last sentence in each stanza, or have them act out sections. Children could each choose one stanza to illustrate a mural made of the result.

THE WALRUS AND THE CARPENTER

From "Through The Looking Glass"
by Lewis Carroll

abbreviated form to use in kindergarten by Mildred G. Jones

The sun was shining on the sea,
Shining with all its might:
And this was odd because it was
The middle of the night.

The sea was wet as wet could be.
The sands were dry as dry
You could not see a cloud, because
No cloud was in the sky.

The Walrus and the Carpenter
Were walking close at hand.
"O Oysters, come and walk with us!"
The Walrus did beseech
"A pleasant walk, a pleasant talk,
Along the briny beach."

The oldest Oyster looked at him,
But never a word he said.
The oldest Oyster winked his eye.
And shook his heavy head.

But four young Oysters hurried up
All eager for the treat.
Their coats were brushed, their faces washed,
Their shoes were clean and neat -
And this was odd because, you know,
They hadn't any feet.

Four other Oysters followed them,
And more and more and more
All hopping through the frothy waves,
And scrambling to the shore.

The Walrus and the Carpenter
Walked on a mile or so,
And then they rested on a rock
Conveniently low.
And all the little Oysters stood
And waited in a row.

"The time has come," the Walrus said
"To talk of many things:
Of why the sea is boiling hot -
And whether pigs have wings."

"But wait a bit," the Oysters cried,
"Before we have our chat,
For some of us are out of breath
And all of us are fat."
"No hurry," said the Carpenter.
They thanked him much for that.

"A loaf of bread," the Walrus said,
"Is what we chiefly need.
Now if you're ready, Oysters dear,
We can begin to feed."

"But not on us!" the Oysters cried
Turning a little blue.

"It seems a shame," the Walrus said,
"To play them such a trick."
The Carpenter said nothing but
"The butter's spread too thick."

"I weep for you," the Walrus said.
"I deeply sympathize.
He held his pocket handkerchief
Up to his streaming eyes.

"Oh, Oysters," said the Carpenter,
"You've had a pleasant run!
Shall we be trotting home again"?

But answer came there none, because -
They'd eaten every one!

LANGUAGE ARTS

WRITING

1. Pictionaries

Objective: To help the child learn the alphabet and be conscious of beginning sounds.

Materials: 13 sheets of blank paper per student
pencil and crayons
construction paper
stapler

Procedure: Give each child 13 sheets of blank paper, stapled together like a book. Have the class go through their "books" and print a letter of the alphabet, in order, on each side of each page of their books. Remind them to write only one letter on each page. Select a variety of words used in presenting the "Clams and Other Critters" unit and list them on the board (eg, clam, mussel)

Go over each word with the class and have them decide on what page in their "pictionaries" the word should go. Have them print the word on the correct page and draw a picture of it if possible.

After completing the list of words from the board, the class can keep their "pictionaries" in their desk to use when writing stories and for adding new words. A cover made of construction paper can be made and decorated and will help make the "pictionary" more sturdy.

Alternatively, you and parent helpers could collect pictures from old magazines and paste them on the page that the picture begins with . . . for "C" paste a clam shell, "M" paste a mussel shell.

2, A Big Shell Book

Another good activity in this unit is to write a book. Toward the end of the unit youngsters will have lots of ideas to work on and by dictating their story and supplying illustrations, a beautiful display can be made and appreciated.

If you have a cooperative local fish market you may have the opportunity to see clams and other shell fish prepared for market. You may also have a canning factory in your locality to visit. Local clammers and lobstermen might be tapped for a visit to class or better yet a visit to the wharf. One point to remember is that lobstermen bring up many animals they don't want with each pot they haul. Perhaps one lobsterman would volunteer to keep a collection in a bucket for you.

Language Arts: Group Discussion

With the whole class together sitting on the rug, tape a picture of all kinds of sea life on an easel or chalkboard. Then try to see how many of the different shells and animals the class can identify.

Ideally you should have a large picture or chart so it will be easier to identify the organisms. This may be done in a small group, with each child having their own picture.

MUSIC

Utilize the records suggested in the bibliography as background music for the many activities in this unit.

MATH ACTIVITIES

Sets and Sorting

1. Snail shells are small and easy for young children to handle. Gather together several dozen shells and practice making sets with them; equal sets, sets having more, sets having less, adding with seen and unseen sets, etc.

2. Grandma's Present:

   In a game-like atmosphere distribute to each pair of youngsters a random assortment of shells including at least two representatives of each of the animals Jessie collected for Grandma. A convenient way to handle the materials is to place them on cafeteria trays or paper trays from the meat market. Do the preparation well before the lesson and store the prepared trays out of the way. Before distributing the trays, hold up one shell and ask several class members to tell things about the way it looks or feels. Identify each characteristic property of the shell as it is described. For example, if a student says it "looks pink," state that pink is its color property. Seek a rather long list to include: wavyness, roughness, smoothness, five-sidedness, having two similar parts, having threads, being coiled, etc.

   Just before the trays are handed out, demonstrate with two volunteers one way of classifying three shells on a common property,

eg. being coiled or no-coiled. In the demonstration sample, have two coiled shells and two non-coiled shells. The result should be two piles of shells each demonstrating the property and its opposite. With the idea of properties in place, distribute the trays and have them classify all shell materials on the tray according to any one property. Do not indicate the property to be used but get each partnership to decide the one to use. Don't be alarmed if they change properties in midstream or are confused about what to do; this skill often requires considerable practice and reinforcement.

The activity should be repeated several different times and during the course of repetition, encourage those who master single property classification to try to make 3 or 4 piles of shells so that a number of properties are illustrated.

Again, hierarchial classification, in which a series of mutually exclusive properties are mixed with non-exclusive properties is much too difficult for youngsters of this age level. Most youngsters master the classificational task of putting gray, coiled, bumpy shells apart from all others only about age 10 to 11.

At the conclusion of the sorting exercise, it might be a good idea to glue some of the collection on heavy cardboard for permanent displays. Some youngsters may want to make necklaces with shells of increasing size or the same color, etc.

HOME ECONOMICS

While 5 or 6 year old youngsters usually prefer a diet of cold breakfast cereal and franks, this unit is a good place to try to break in on this slim list of acceptable goodies and do a little steamed clam or mussel eating during snack time. We suggest that you either purchase your clams or mussels for eating purposes or check carefully for local ordinances and pollution conditions before collecting

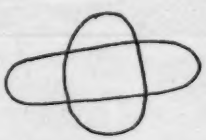
To prepare clams in the shell place in a covered kettle with a little water and put the pot over a high heat. Usually about 7 - 10 minutes after steaming begins the shells open and the feast is ready.

We like to use "oyster sauce" on steamed clams made by mixing together 125 ml of catsup, 50 ml of lemon juice and 10 drops of tabasco sauce with a little salt and pepper. The sauce improves if it stands several hours before use.

Mussels are plentiful, easy to find and collect. They grow in cool water at low tide level, attached to rocks or pilings by strong threads called "byssus" or "beard" or in clusters stuck in the mud or sand. Preferred gathering places are rocky areas where the mussels are cleaner and less likely to contain pearls. Mussels are commercially available if you don't want to gather them yourself. Mussels cannot be collected for use from polluted areas or during a red tide. If you are in doubt, contact your local Marine Advisory Service Office, or your State Department of Marine Resources.

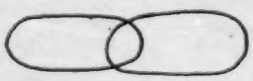
Games: Grandma, May I? and Grandma Said So

This game is designed primarily for first graders who may be doing the unit in connection with learning more about classification or "sets." Start the game by placing certain groups of shells on a tray and asking partnerships to decide how Grandma might have decided to arrange the groups. One such grouping could have three piles of 4 shells on it, pile 1 being coiled; 2, rough; 3, sharp. A variation of this is to use rope or twine to make set diagrams physically on the table or floor and play the game Grandma Said So. In this game, one child plays the part of Grandma and decides what the properties can be in each place in the intersection of the ropes. Each of the other 3 or 4 players are given a pile of shells and asks in turn, "Grandma, may I" to see if a shell can go into one of the spaces. If "Grandma" says yes, the shell is placed into that section and play continues around the circle of players. The winner is the player whose shells are correctly placed into the ropes before the others run out of shells. At the end of the game, "Grandma" asks the winner to state the rules for the ropes.



Rope Diagram for "Grandma, May I"

For less mature children, the rope form can be simplified as illustrated, making fewer common characteristics necessary.



Music Resources

To Sing:

"The Crawdad Song" an American Folk Song about a Crayfish

"Molly Malone" an Irish Folk Song about Mussels and Cockles being sold

To Hear:

"Sounds of the Sea" #3 of Droll Yankees Seaport Series DY103
Droll Yankees, Inc.
Providence 6, R.I. (1962)

On-site recording of surf, gulls, boats, etc.

The Best in Children's Literature, Series 2 - "Sights and Sounds - The Seashore Noisy Book"

Bibliography

Story Books

1. Kindergarten Keys, Teacher's Guidebook - The Economy Company. (Sea Animals Unit). Putnam
2. Come Again Pelican, Freeman, Don Viking
3. Biggest Fish in the Sea, Ipcar, Dahlov Viking
4. The Beach Before Breakfast, Kumin, Maxine Putnam
5. Grandma's Beach Surprise, List, Ilka K. Putnam
6. Bert Dow, McCloskey, Robert Viking
7. One Morning in Maine, McCloskey, Robert Viking
8. Time of Wonder, McCloskey, Robert Viking
9. Kermit the Hermit, Peet, Bill
10. Hide and Seek Fog, Tresselt, Alvin Weekley Reader Book Club

11. Rain, Drop, Splash, Tresselt, Alvin, Lothrop, Lee and Shepard Co.

12. Emile, Ungerer, Tomi Harper

13. I'm All Thumbs, Ungerer, Tomi Harper

14. A Day at the Beach, Vasiliu, Mircea Randam House

Reference Books

1. Fiddler Crab, Adrift and Ashore, Adrian, Mary. 1962, Holiday House, Inc.

2. The Uncommon Cookbook, Phyllis Coggins. 1975, Ira C. Darling Center, Walpole, Maine.

3. Handbook for Mirror Cards, ESS (Elementary Science Study). 1967, Webster Division, McGraw Hill Book Co., New York.

4. Junior Science Book of Seashells, Epstein, Sam. 1963, Garrard Pub. Co. Champaign, Ill.

5. Houses From the Sea, Goudey, Alice E. 1959, Charles Scribners Sons, N.Y.

6. Questions and Answers About Sea Shore Life, List, Ilka K. 1972, Four Winds Press, New York.

7. Seashells in Action, Newall, Audrey. 1973. Walker and Co., New York.

8. Pebbles and Shells, Padendorf, Illa. 1954. Children's Press, Inc., Chicago, Ill.

9. The Little Shell Hunter, Sorrells, Dorothy. 1961. Stick-Vaughn, Co. Austin, Texas.

ADDITIONAL REFERENCES

National Geographic, March 1969, had an article that contains a number of photographs, highly magnified, of mollusks with the live animals and their body parts clearly presented. The pictures can be presented to a group by use of an opaque projector. The magazine can also be an addition to the science table. The article itself is a reference for the teacher.

Maine Times, July 26, 1974, had an article on Moon Snails. The article contains excellent information for the teacher. A simple, but excellent line drawing shows the snail with mantle extended, and the sand dollar near near the high tide line. (Beach grasses in the background tie in well with "Grandma's Beach Surprise" or other Sea Shore Books).